# 3.0024 UNUSUAL CASE BUILDING BEHAVIOR OF HYDROPSYCHE OCCIDENTALIS LARVAE (TRICHOPTERA: HYDROPSYCHIDAE)[1]

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During the course of an investigation of the distribution and productivity of Trichoptera larvae in a Colorado mountain stream unusual case building behavior was noted in the net-spinning larvae of *Hydropsyche occidentalis* (Banks). Over 700 larvae of this species were hand picked from the substrate of the St. Vrain River in Boulder County, Colorado at elevations of 1750–2050 m (T3N, R71W, S26) (T2N, R71W, S6) from June, 1968, to May, 1969.

From late May to late October the larval case of *Hydropsyche occidentalis* consisted of a loosely woven tube 7–12 mm in length supported by small pebbles and vegetable matter. A net was spun by this species in front of the case to aid in the capture of food. With the onset of colder temperatures in November, *H. occidentalis* remained inactive in a highly modified overwintering case or hibernaculum. The food net was not present and the case was reinforced with larger pebbles to form a dense, more convex house rarely exceeding 7 mm in length. Pupal cases were found infrequently in late spring and early summer and consisted of an elongate tube in which large anchoring stones were utilized at the lateral margins.

Authors such as Hynes (1961) have reported the seasonal habits of Trichoptera larvae and Copeland and Crowell (1937), Fankhauser and Reik (1935), and Milne (1938) have investigated the case building behavior of many species. Elliott (1968) reports that some genera overwinter as fifth instar "resting larvae" but no special case modifications are present.

It is difficult to speculate on the adaptive value of the hibernaculum of *Hydropsyche occidentalis* but such a structure could aid in resisting ice

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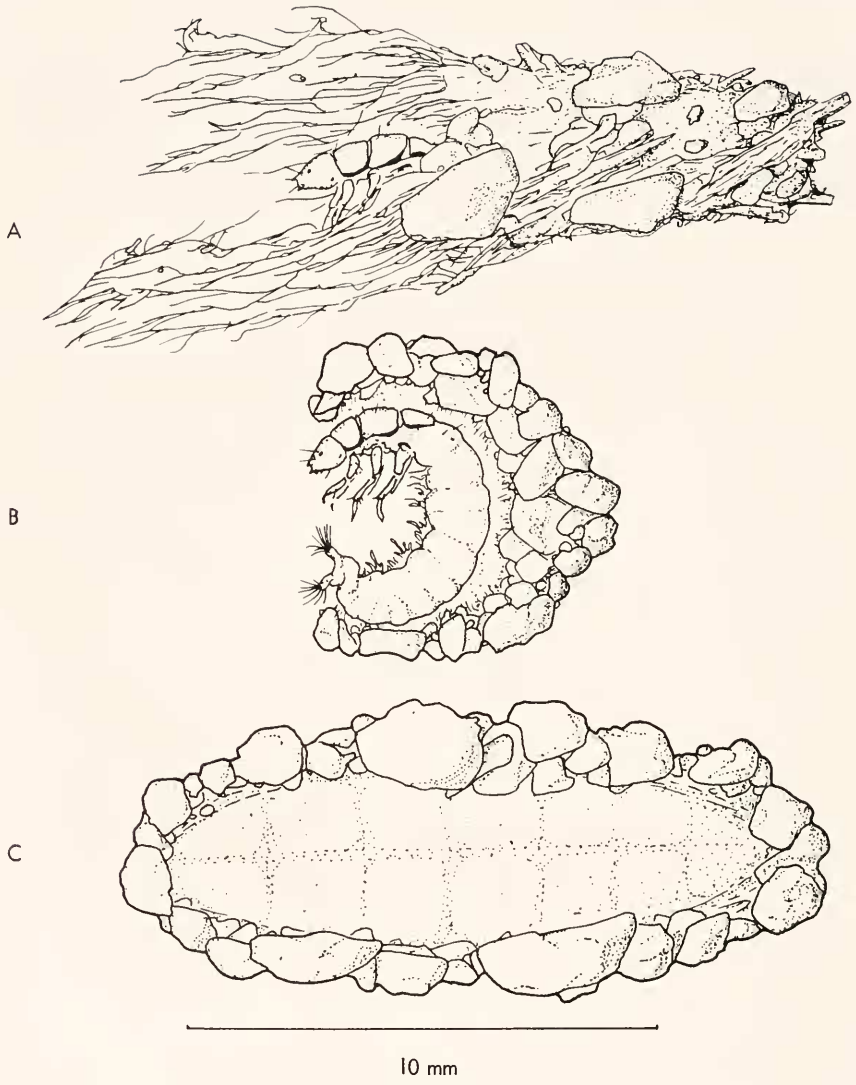


FIG. 1. The summer case (A), winter case or hibernaculum (B), and pupal case (C) of *Hydropsyche occidentalis* in the St. Vrain River of Colorado.

and flooding. *Brachycentrus americanus* and *Ecclisomyia maculosa* were common at the same elevation as *Hydropsyche occidentalis* but the standing crops of both of these species were sharply reduced with the appearance of anchor ice in November and again during heavy flooding in early May.

There was no significant reduction in the number of *H. occidentalis* larvae during ice cover and this species suffered far less mortality during spring runoff than did *B. americanus* and *E. maculosa*.

Literature Cited

Copeland, M., and Crowell, P. S. 1937. Observations and experiments on the case-building instincts of two species of Trichoptera. Psyche 64: 125–131.

Elliott, J. M. 1968. The life histories and drifting of Trichoptera in a Dartmoor stream. Jour. Animal Ecol. 37: 615–625.

Fankhauser, G., and Reid, L. E. 1935. Experiments on the case building of the caddis-fly larva, *Neuronia postica* Walker. Physiol. Zool. 8: 337–359.

Hynes, H. B. N. 1961. The invertebrate fauna of a Welsh mountain stream. Arch. Hydrobiol. 57: 344–388.

Milne, M. J. 1938. Case building in Trichoptera as an inherited response to oxygen deficiency. Canadian Ent. 70: 177–179.

**2.0024 Case building behavior Hydropsyche occidentalis larvae (Trich., Hydropsychidae)**

Abstract.—During the course of an investigation of the distribution and productivity of aquatic insects in the St. Vrain River of Colorado unusual case building behavior was noted in the net-spinning larvae of *Hydropsyche occidentalis*. During the warmer months (April to October) the larval case consisted of a loosely woven tube of small stones and vegetable matter. A net was spun by this species in front of the case to aid in the capture of food. The pupal case of *H. occidentalis* had a rigid closed construction in which large anchoring stones were utilized at the lateral margins. The unusual aspects of case construction were seen during the winter months. With the onset of cold temperatures in November *H. occidentalis* destroyed the food net and reinforced its case with pebbles to form a thicker, more convex house in which the animal remained inactive until spring. The adaptive significance of this behavior is unknown but perhaps it serves to resist heavy icing.—J. O. Mecom

*Descriptors:* Trichoptera; Hydropsychidae; Hydropsyche occidentalis; behavior; case; Colorado; hibernaculum.